REMARKS/ARGUMENTS

The Office Action mailed August 10, 2005 has been reviewed and carefully considered.

Claims 1, 9, 16, 24, and 25 have been amended. Claims 1-6 and 8-29 are pending. No new matter has been added.

Claims 1-6, 8-23, and 25-29 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,240,140 to Lindbergh et al. (hereinafter "Lindbergh") in view of U.S. Patent No. 5,838,268 to Frenkel. Claim 24 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Frenkel in view of U.S. Patent No. 5,808,463 to Nagano.

It is respectfully asserted that none of the cited references teach or suggest the following limitations of Claim 1:

> A method for processing a received analog signal having a plurality of carrier signals modulated thereon, comprising:
> band limiting the received analog signal to obtain a band limited analog signal;
> converting the band limited analog signal into a digital data stream representative of the plurality of carrier signals;
> extracting from said digital data stream, data carried by at least two of the plurality of carrier signals; and
> combining at least portions of the data extracted from said at least two carrier signals to form a complete bitstream, said extracted data having associated with it stream identifier and sequence code information for, respectively, identifying the complete bitstream corresponding to the extracted data and determining the position of the extracted data within the complete bitstream.

Further, it is respectfully asserted that none of the cited references teach or suggest the following limitations of Claim 16:

> A method for processing a received analog signal having a plurality of carrier signals modulated thereon, comprising:
> band limiting the received analog signal to correspond to a transmission frequency band of the received analog signal to obtain a band limited analog signal;
> converting the band limited analog signal into a digital data stream representative of the plurality of carrier signals;

processing the digital data stream to pass a plurality of digitized carrier signals, each of said digitized carrier signals having modulated thereon, and within a channel bandwidth, a respective data bearing stream;

derotating each of the digitized carrier signals to produce respective derotated carrier signals;

demodulating each of at least two filtered carrier signals to extract therefrom respective data bearing streams; and

combining data from at least two data bearing streams into a resultant data stream, said at least two data bearing streams comprising respective portions of said resultant data stream.

Moreover, it is respectfully asserted that none of the cited references teach or suggest the following limitations of Claim 24:

A method for processing a received analog signal having a plurality of carrier signals modulated thereon, comprising:

band limiting the received signal to pass substantially those frequencies occupying a spectral transmission region between a first frequency f_1 and a second frequency f_2;

converting, using an analog-to-digital converter having a sampling rate f_s, the band-limited signal to produce a digital signal therefrom, said sampling rate f_s being greater than f_2;

derotating each of a plurality of data bearing signals within said digital signal to produce respective derotated signals;

filtering each of the respective derotated signals to remove channel energy outside of a respective defined channel;

decimating each of the filtered and derotated signals to reduce the number of samples representing each data bearing signal;

demodulating each of at least two filtered carrier signals to extract therefrom respective data bearing signal; and

combining at least respective portions of at least two of the resulting decimated data bearing signals into a single data signal.

Also, it is respectfully asserted that none of the cited references teach or suggest the following limitations of Claim 25:

> Apparatus for processing a received analog signal having a plurality of carrier signals and respective data modulated thereon, comprising:
>
> a band limiter, for band limiting the received analog signal to obtain a band limited analog signal;
>
> an analog to digital converter, for converting the band limited analog signal into a digital data stream representative of the plurality of carrier signals and respective data;
>
> a plurality of channel processors, for extracting from said digital data stream, data carried by respective carrier signals; and
>
> a processor, for combining at least portions of said data extracted from at least two carrier signals to produce a complete bitstream, said extracted data having associated with it stream identifier and sequence code information for determining, respectively, the complete bitstream corresponding to the data and the sequence within the complete bitstream of the data.

Thus, in all of independent Claims 1, 16, 24, and 25, an analog signal having a plurality of carrier signals modulated thereon is received by a receiver. The received analog signal is converted to a digital signal representative of the plurality of carrier signals, and data carried by the plurality of carrier signals is extracted from the digital signal.

In contrast, Lindbergh discloses a transmitter and corresponding receiver, shown in FIGs. 2 and 3, respectively, and in FIG. 1 collectively. As can be seen in ALL of FIGs 1, 2, and 3 of Lindbergh, Lindbergh discloses a plurality of communication channels between the transmitter and the receiver with corresponding supporting hardware for the plurality of communication channels. Thus, in further detail with respect to the receiver, Lindbergh discloses that a **PLURALITY of DIGITAL signals are received by the receiver OVER a PLURALITY of communication channels 14 for input into a PLURALITY of "INITIAL RECEIVE queues" 38, where each of the initial receive queues is "UNIQUELY ASSOCIATED" with a respective one of the plurality of communication channels** (Lindbergh, FIG. 3, and col. 6, lines 15-20). The specifically selected name of element 38 by Lindbergh, namely "**INITIAL RECEIVE** queues", clearly illustrates that the signals are received in digital form. As is known, fiber optic cables and so forth may be suitable mediums for transmitting digital signals such as those disclosed in Lindbergh.

Thus, while the present invention essentially recites that a **single analog signal** is received by a receiver and that the received analog signal has a plurality of carrier signals modulated thereon, Lindbergh discloses that a **plurality of digital signals** is received by his receiver over a plurality of communication channels. Therefore, based on this fundamental difference in approach between the claimed invention and Lindbergh, Lindbergh would not even have a need to have a single analog signal having a plurality of carrier signals modulated thereon. Moreover, Lindbergh teaches away from the claimed invention by breaking up a continuous data stream into data sets where each of the data sets is transmitted over a separate communication channel via a separate digital signal, while the present invention is combining the data into a single analog signal for transmission.

Moreover, while the present invention essentially recites the data carried by the plurality of carrier signals is extracted from the (single) digital data stream (see also, Applicants' specification, FIG. 1, and p. 4, lines 4-6, disclosing "[t]he output signal S3 of the A/D converter 120 is coupled to an input of each mixed within the channel processors 130_1 through 130_N"), Lindbergh discloses extracting respective data sets from each respective one of plurality of different digital signals. That is, the present invention extracts different data sets from the same digital signal that represents a plurality of carrier signals having data modulated thereon, while Lindbergh extracts different data sets from respective different ones of a plurality of digital signals.

Accordingly, the operation and approach of the claimed invention and Lindbergh are significantly different. For example, the hardware alone involved in receiving a single analog signal verses a plurality of digital signals over a plurality of communication channels is significantly different (as is evident from simply a cursory review of the FIG. 1 of the Applicants specification, including for example, analog processing section 110 and ADC 120, verses FIG. 3 of Lindbergh which does not need and, therefore, does not include these elements).

Frenkel does not cure the deficiencies of Lindbergh. For that matter, Frenkel is not even properly combinable with Lindbergh. For example,

Lindbergh, as mentioned above, discloses a complimentary transmitter and receiver pair where the receiver receives a plurality of digital signals over a plurality of channels for initial receipt by a plurality of "**INITIAL** receive queues". It is to be further noted that each of the multiple signals received over the multiple channels in Lindbergh includes a portion of a bitstream, previously partitioned at the transmitter (by the transmitter aggregator 26 in particular) using patterning, for recombination at the receiver. That is, the transmitter employs a pattern by which data is allocated to each of the communication channels during transmission of a data set (see, e.g., Frenkel, col. 6, lines 43-67). The pattern must be known and utilized at the receiver to retrieve and combine the data sets.

Frenkel is directed to apparatus and methods for modulation and demodulation (Frenkel, Title). The cited Figure of Frenkel, namely FIG. 2, shows a demodulator that is "particularly useful in demodulating data which was modulated by the data modulating system of FIG. 1" (Frenkel, col. 8, lines 54-56). The modulator and demodulator of Frenkel are directed to modulating carrier signals with multiple bit streams (see, e.g., Frenkel, Abstract, col. 1, 36-40, and col. 3, lines 40-43). That is, Frenkel forms an output signal in his demodulator from at least two synchronized input streams.

Thus, a combination of Lindbergh and Frenkel results in a receiver having a demodulator that receives an input signal and outputs a digital bitstream that corresponds to "at least first and second synchronized incoming streams" (i.e., more than one signal) that were modulated at the transmitter. Accordingly, since each "initial receive queue" of Lindbergh receives one of a plurality of signals, where each signal corresponds to a single data set to be combined with other data sets by Lindbergh's receive recombiner 42 (see, e.g., Lindbergh, FIG. 3), a digital bitstream as output from the demodulator of Frenkel would include more than one dataset (since it is demodulating **multiple** synchronized incoming streams) and would likely "confuse" the strict patterning required by the receiver of Lindbergh. Moreover, the hardware structure of Lindberg is configured to receive a single data set per channel and is not set up to receive and process more than a single data set per channel for a given

transmission. For example, as disclosed in Lindberg, "[d]uring transmission of a given data set, the transmitter and receiver apply a fixed deterministic rule for allocating transmission data to each of the communication channels. This requires that during the transmission of a single data set, the number of channels in use and proportion of the data set sent to each channel remain constant" (Lindbergh, col. 6, lines 52-59).

Moreover, given the approach of Lindbergh in partitioning a continuous stream into separate data sets that are transmitted in respective different signals over respective separate channels, there is no motivation for going against this partitioning to combine data sets or data streams at the receiver for a modulation step, which clearly teaches away from the approach of Lindbergh. That is, given the arrangement (e.g., the plurality of separate channels by which separate data sets are transmitted) and purpose of Lindbergh's receiver (to receive the data sets in the specific patterning imposed by the transmitter for the plurality of signals transmitted over the plurality of channels and to use that specific patterning to extract the date sets for recombination), there is no need and, thus, no motivation for using the teachings of Frenkel to further alter the very strict and well-defined data structure (patterning) necessary for the proper operation of the receiver of Lindbergh. For example, it would not be desirable to complicate or otherwise alter his approach of breaking down a continuous data stream into data sets where each data set is transmitted via a different channel to allow for more combining of data via the modulation process. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention when there is some teaching, suggestion, or motivation to do so found either implicitly or explicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art (see, e.g., MPEP §2143.01). Accordingly, the demodulator of Frenkel is not combinable with Lindbergh.

Moreover, even assuming arguendo that Frenkel is properly combinable with Lindbergh, Frenkel still does not cure the deficiencies of Lindbergh and

even when combined with Lindbergh (or Nagano) still does not teach or suggest all of the above-recited limitations of Claims 1, 16, 24, and 25.

For example, Frenkel does not teach or suggest the following limitations of Claim 16:

> band limiting the received analog signal to correspond to a transmission frequency band of the received analog signal to obtain a band limited analog signal;
>
> converting the band limited analog signal into a digital data stream representative of the plurality of carrier signals;

Moreover, Frenkel does not teach or suggest the following limitations of Claim 24:

> band limiting the received signal to pass substantially those frequencies occupying a spectral transmission region between a first frequency f_1 and a second frequency f_2;
>
> converting, using an analog-to-digital converter having a sampling rate f_s, the band-limited signal to produce a digital signal therefrom, said sampling rate f_s being greater than f_2;

Thus, to use the example provided in the Applicants' specification, "[t]he analog processor 110 receives an analog input signal S1 comprising, illustratively, a 950-1,450MHz signal.... The bandpass filter 114 rejects out-of-band frequency components (e.g., those frequency components approximately below 950MHz and above 1,450MHz). Relating the example to the variables in Claim 16, f_1 corresponds to 950MHz and f_2 corresponds to 1,450MHz. In contrast, the demodulator shown in FIG. 2 of Frenkel down converts a radio frequency (RF) to an intermediate frequency (IF), and then converts the resultant intermediate frequency to a digital signal (Frenkel, FIG. 2, col. 8, lines 59-67). Clearly, an intermediate frequency is not a transmission frequency band, but rather a lower frequency for subsequent processing. Accordingly, neither Frenkel nor any of the other cited references teach or suggest the above-recited limitations of Claims 16 and 24.

Further, with respect to the sequence code information recited in Claims 1 and 25, while data extracted from at least two carrier signals has associated

therewith sequence code information for determining the sequence within the complete bitstream, Lindbergh discloses a sequence number that "is incremented each time a new header set is generated, thus providing all headers in a header set with a common identifying parameter" (Lindbergh, col. 7, lines 28-33). It is respectfully asserted that information for determining the sequence within a complete bitstream does not correspond to information for providing all headers in a header set with a common identifying parameter. For example, the difference is identifying the ordering of elements (sequence) within a group (complete bitstream) versus simply identifying the group itself. Thus, the sequence number 64 disclosed in Lindbergh does not correspond to the sequence code information recited in Claims 1 and 25. Moreover, the approach taken the present invention provides a less rigid data allocation approach than that employed by Lindbergh. For example, patterning generally requires that the pattern is repeated a number of times with specific constraints imposed to implement and maintain the patterning from transmitter to receiver. That is, as noted above, Lindbergh discloses "[d]uring transmission of a given data set, the transmitter and receiver apply a fixed deterministic rule for allocating transmission data to each of the communication channels. This requires that during the transmission of a single data set, the number of channels in use and proportion of the data set sent to each channel remain constant" (Lindbergh, col. 6, lines 52-59). In contrast, the use of information that identifies the complete bitstream and, in particular, the position of the extracted data within the complete bitstream as recited in Claims 1 and 25, clearly inherently allows for non-fixed allocation of data among the plurality of carrier signals since the exact position can be identified and patterning is not used. Neither Lindbergh nor any of the other cited references teach or suggest the preceding limitations of Claims 1 and 25.

Thus, neither Lindbergh nor Frenkel disclose the above-recited limitations of Claims 1, 16, 24, and 25. Moreover, Nagano is silent with respect to the above-recited limitations of Claims 1, 16, 24, and 25.

Accordingly, it is respectfully asserted that none of the cited references, either taken singly or in any combination, disclose all of the limitations recited in

independent Claims 1, 16, 24, and 25. "To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art" (MPEP §2143.03, citing *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)). Accordingly, Claims 1, 16, 24, and 25 are patentably distinct and nonobvious over the cited references for at least the reasons set forth above.

"If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious" (MPEP §2143.03, citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)).

Claims 2-6 and 8-15 depend from Claim 1 or a claim which itself is dependent from Claim 1 and, thus, include all the limitations of Claim 1. Claims 17-23 depend from Claim 16 or a claim which itself is dependent from Claim 16 and, thus, include all the limitations of Claim 16. Claims 26-29 depend from Claim 25 and, thus, include all the limitations of Claim 25. Accordingly, Claims 2-6 and 8-15 are patentably distinct and non-obvious over the cited references for at least the reasons set forth above with respect to Claim 1, and Claims 17-23 and 26-29 are patentably distinct and nonobvious over the cited references for at least the reasons set forth above with respect to Claims 16 and 25, respectively.

Accordingly, reconsideration of the rejections is respectfully requested.

In view of the foregoing, Applicants respectfully request that the rejection of the claims set forth in the Office Action of August 10, 2005 be withdrawn, that pending claims 1-6 and 8-29 be allowed, and that the case proceed to early issuance of Letters Patent in due course.

It is believed that no additional fees or charges are currently due. However, in the event that any additional fees or charges are required at this time in connection with the application, they may be charged to applicant's Deposit Account No. 07-0832.

Respectfully submitted,

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